WHAT IS CLAIMED IS:

1. A process of cleaning a precision surface comprising contacting an etched precision surface having vias, cavities, trenches or channels incorporated therein with a composition which comprises liquid or supercritical carbon dioxide and a fluoride-generating species.

2. A process in accordance with Claim 1 wherein said fluoride-generating source is a fluorine-containing acid.

3. A process in accordance with Claim 1 wherein said fluorine-containing acid is selected from the group consisting of hydrogen fluoride, fluorosulfonic acid and perfluorosulfonic acid.

4. A process in accordance with Claim 1 wherein said fluoride-generating species is a fluorine-containing acid amine adduct.

5. A process in accordance with Claim 4 wherein said fluorine-containing amine adduct is pyridine:hydrogen fluoride, amine:hydrogen fluoride or an alkylamine:hydrogen fluoride.

6. A process in accordance with Claim 1 wherein said fluoride-generating species is an amine fluoride.

7. A process in accordance with Claim 1 wherein said fluoride-generating species is a quaternary amine fluoride.

8. A process in accordance with Claim 7 wherein said quaternary amine fluoride is selected from the group consisting of a tetraalkylammonium fluoride and a perfluoroalkylammonium fluoride.

9. A process in accordance with Claim 1 wherein said fluoride-generating species is a perfluororalkylsulfonyl fluoride.

10. A process in accordance with Claim 9 wherein said perfluororalkylsulfonyl fluoride is trifluoromethylsulfonyl fluoride or perfluorooctylsulfonyl fluoride.

11. A process in accordance with Claim 1 wherein said fluoride-generating species is an alkylsulfonyl fluoride.

12. A process in accordance with Claim 1 wherein said fluoride-generating source is an arylsulfonyl fluoride.

13. A process in accordance with Claim 1 wherein said fluoride-generating source is an onium salt-containing fluorine.

14. A process in accordance with Claim 13 wherein said onium salt containing fluorine is selected from the group consisting of benzene diazonium fluoride and benzene diazonium tetrafluoroborate.

15. A process in accordance with Claim 1 wherein said composition includes a component selected from the group consisting of surfactant, a co-solvent and mixtures thereof.

16. A process in accordance with Claim 1 wherein said contact between said precision surface and said composition occurs at a pressure in the range of between about 1,000 psi and about 6,000 psi and at a temperature in the range of between about 40°C and about 100°C.

17. A process in accordance with Claim 1 wherein said precision surface is provided by a semiconductor sample, a metal selected from the group consisting of aluminum, silicon, tungsten, titanium, tantalium, platinum, palladium, iridium, chromium, copper and silver, a polymer selected from the group consisting of polyimides and polyamides or insulators.

18. A process in accordance with Claim 17 wherein said precision surface is provided by a semiconductor sample.

19. A process in accordance with Claim 18 wherein said semiconductor sample is selected from the group consisting of a semiconductor wafer, a semiconductor chip, a ceramic substrate and a patterned film structure.

20. A process in accordance with Claim 19 wherein said semiconductor sample is a semiconductor wafer.